

26. On the Anomodont Genera, *Pristerodon* and *Tropidostoma*. By Lieut. R. BROOM, M.D., D.Sc., C.M.Z.S., R.A.M.C.

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PRISTERODON MCKAYI Huxley. (Text-fig. 1.)

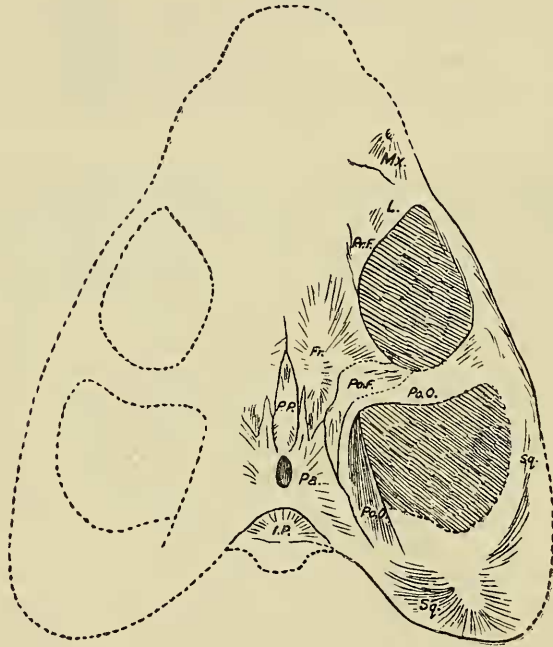
In 1868 Huxley described, under the name *Pristerodon mckayi*, a fairly well-preserved skull of a small Anomodont reptile. Almost the whole of the right side is shown in good condition, and a considerable part of the left side. There are also associated with the specimen, besides the jaws belonging to the skull, a few other mandibular remains. Huxley apparently believed the animal to be a lizard, as he refers to the specimen as "a shattered lacertilian skull, having very much the general shape of that of *Rhynchosaurus*, being very broad posteriorly owing to the large size of the supratemporal fossa, and tapering anteriorly."

The skull when complete probably measured 87 mm. from the snout to the transverse plane of the squamosals, and the greatest breadth is about 70 mm. The interorbital measurement is 17 mm., and the intertemporal measurement 18.5 mm. The antero-posterior measurement of the orbit is 22 mm. In the type-skull there is no tusk, the animal having been a female, but a specimen in the South African Museum shows a *Dicynodon*-like tusk. The maxilla and the mandible have each, as shown by Huxley, a series of small teeth which have high crowns remarkable for being smooth in front and having about 8 or 9 relatively strong denticulations on the posterior side. The exact number of teeth appears to vary with age, but in the type there appear to be as many as 12 arranged somewhat irregularly and one or two being probably replacing teeth.

In structure the skull is typically *Dicynodont*. The frontals are large and pass backwards between the postfrontals and preparietal. The postfrontal is well developed, but in the specimen it is difficult to be quite sure of the sutures of its anterior and outer end, but they are probably as I have figured them, in dotted line. The postorbital is a larger bone which forms most of the postorbital arch and the whole of the inner border of the temporal fossa. The preparietal is long and

narrow, and extends back nearly to the pineal foramen. It is, however, doubtful if it reaches the foramen, the appearances being rather in favour of the parietals just meeting in front of the foramen and shutting out the preparietal. The parietal is a fairly large flat bone. The interparietal is of moderate size and forms the upper part of the occiput. The squamosal is large and typically *Dicynodont* in character. The specimen shows part of the quadrato-jugal in front of the lower part of the squamosal.

Text-figure 1.

Skull of *Pristerodon mckayi* Huxley. Nat. size.

Left side and snout restored. B.M., R 1810.

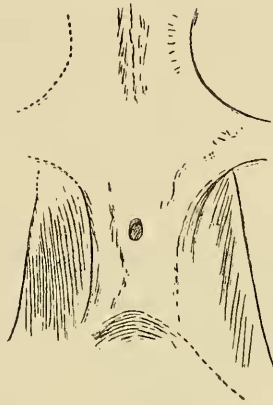
Fr., frontal; *L.P.*, interparietal; *Ju.*, jugal; *L.*, lacrimal; *Mx.*, maxilla; *Na.*, nasal; *Pa.*, parietal; *Pal.*, palatine; *Pm.*, premaxilla; *Po.F.*, postfrontal; *Po.O.*, postorbital; *P.P.*, preparietal; *Pr.F.*, prefrontal; *Pt.*, pterygoid; *P.Vo.*, prevomer; *T.P.*, transpalatine.

The lower jaw is not well preserved. As is seen in one of Huxley's figures, the angular has, as in *Dicynodon*, a fan-like expansion passing inwards and downwards. In front of the articulation is a plate of bone passing outwards and forwards, apparently part of the surangular.

PRISTERODON RANICEPS (Owen)*. (Text-fig. 2.)

In 1876 Owen briefly described, under the name *Oudenodon raniceps*, a small skull and jaws from the same locality, East London, as Huxley's type. Owen gives no figure of the specimens, but merely describes the skull as follows:—"The occipital condyle is low and broad; the lateral portions contributed by the exoccipitals simulate the Batrachian double condyle. The supra-occipital surface is much depressed. The temporal fossæ are large, with the long diameter lengthwise. The orbits appear to have been small."

Text-figure 2.



Frontal and parietal regions in *Pristerodon raniceps* (Owen). Nat. size.
B.M., R 1650.

Lydekker, in his Catalogue of 1890, refers the specimens doubtfully to *Udenodon bairi* Ow., believing that they were of a young individual.

It is rather remarkable that both Owen and Lydekker should have referred the specimens to *Oudenodon*, seeing that a considerable number of teeth are well exposed to view in the lower jaw. The teeth agree closely with those of *Pristerodon mckayi*, but the denticulations are relatively rather coarser.

The skull is much crushed, but probably measured about 92 mm. from the snout to the plane across the posterior borders of the squamosals, and the greatest breadth is about 80 mm. The interorbital measurement is 16 mm. and the intertemporal 28 mm. The antorbital portion of the skull appears to be relatively shorter than in *Pristerodon mckayi*. Unfortunately no sutures can be clearly made out in the present condition of the specimen, but, as will be seen by the figure I give of the parietal region, the

* [The parentheses around the names of authors placed after scientific names in this paper are used in accordance with Article 23 of the International Rules of Nomenclature (Proc. 7th Int. Cong. Boston, 1907, p. 44 (1912)).—EDITOR.]

relative proportions of the parts differ very considerably from those of the type species.

In the lower jaw there appears to be a series of 6 teeth with some replacing ones.

Seeing that Owen's specimen came from the same locality as Huxley's I was inclined to regard them as belonging to the same species, but the differences in proportions appear to be sufficiently great to warrant us at least provisionally in regarding them as distinct.

PRISTERODON AGILIS (Broom).

In 1904 I described, in the Records of the Albany Museum, the skull of a small Anomodont found by me at Pearston. At that time it was not known that *Oudenodon* is the female of *Dicynodon*, and as the Capetown specimen of *Pristerodon mckayi* is tusked, and the new allied form which I discovered being tuskless, I placed it in a new genus and called it *Opisthoctenodon agilis*. As, however, the tusk is now known to be a sexual character, this species must be placed in Huxley's genus *Pristerodon*.

The skull is much smaller than in *P. mckayi* and narrower relatively, but in most characters it agrees closely, and the molars are very similar.

Pristerodon mckayi and *P. raniceps* both come from the *Pareiasaurus* zone, but *P. agilis* is from the *Endothiodon* zone.

PRISTERODON BRACHYOPS (Broom).

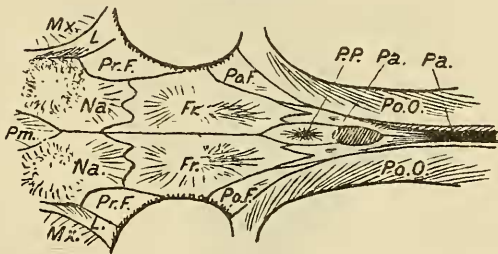
This species when described was also placed in the genus *Opisthoctenodon*. As the crowns of the molars are unknown it is impossible to be certain that it belongs to *Pristerodon*, but it agrees sufficiently to admit of its being placed here, at least provisionally. It is probably from the *Cistecephalus* zone.

TROPIDOSTOMA MICROTREMA (Seeley). (Text-figs. 3 & 4.)

In 1889 Seeley described an Anomodont occiput under the name *Dicynodon microtrema*. The occiput formed part of Mr. T. Bain's collection and was obtained, according to Mr. Watson, on the farm Tafelberg, in the Beaufort West district. In the British Museum there is a good series of Dicynodont skull-remains from the same locality, and the majority belong, I think there is little doubt, to the one species. Fortunately there are a number of snouts and a few mandibles. Both tusked males and tuskless females are represented, and most specimens show evidence of small molars behind the tusk, or caniniform process. The specimens differ considerably in size, doubtless due to difference in age, and the differences in dentition are probably due to the same factor. There appear to be normally four molars, but as age advances they become reduced to three, two, or one, and in old age get completely lost.

A small mandible shows the crowns of two teeth in fairly good preservation. They are seen to agree pretty closely with those of *Pristerodon*. Though the teeth are rather more robust, they are really relatively very much smaller. One might incline on the evidence of the teeth to place these large specimens in the genus *Pristerodon*, but the structure of the parietal region differs so considerably that it is necessary to place them in a different genus. The snout agrees so closely with *Dicynodon* except for the presence of the molars, that one has to consider whether it might not be possible that all species of *Dicynodon* had molars when young which they lost later. This, however, is hardly possible. In no species of *Dicynodon* have molars ever been detected—even where the skulls are manifestly of young animals. Of *Dicynodon platyceps* we know over a dozen skulls, from small ones about 3 inches to others over a foot in length. But in none is there any trace of molars. Further, the peculiar condition of the intertemporal region found in the present species is unknown

Text-figure 3.



Bones of the frontal and parietal regions of the skull of *Tropidostoma microtrema* (Seeley). About $\frac{1}{2}$ nat. size.

For lettering see text-fig. 1, p. 356.

in any species of *Dicynodon*. We may, therefore, safely conclude that *Dicynodon microtrema* Seeley must be placed in a distinct genus. Another specimen, figured by Seeley in 1889, was an occiput which he named *Dicynodon (Tropidostoma) dunnii*. Lydekker regarded this specimen—quite rightly, I think—as belonging to the same species as that named *D. microtrema*. And if this be so we must accept the generic name *Tropidostoma* for the type.

Though there is no complete skull in the collection, one is fairly complete, and there are so many snouts, occiputs, and other portions, that practically every detail of the structure can be made out.

The skull, in what appears to be an adult male, measures from the snout to the plane cutting the posterior borders of the squamosals 266 mm., and the greatest width across the squamosals is about 220 mm.

The following are the other principal measurements :—

Measurement between the canines, 40 mm. to 48 mm.

Interorbital width, 25 mm.

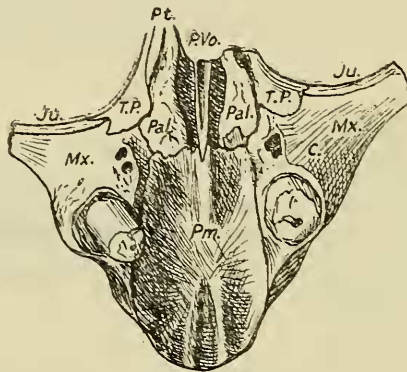
Measurement across the nasal bosses, 44 mm. to 52 mm.

Interorbital measurement, 36 mm. to 38 mm.

Intertemporal measurement, 28 mm. to 36 mm.

The premaxilla is relatively narrow in front. It has the usual pair of palatal ridges seen in most Anomodonts. It forms much the larger part of the hard palate, and meeting the palatine behind shuts out the maxilla from the margin of the posterior nares. In the middle line the premaxilla meets the prevomer, as shown in the figure.

Text-figure 4.



Anterior palatal region of *Tropidostoma microtremata* (Seeley). $\frac{1}{2}$ nat. size.

Showing the relations of the palatal elements and tooth-sockets behind the canines.
B.M., R 860.

For lettering see text-fig. 1, p. 356.

The maxilla is very similar to that of *Dicynodon* except for the presence of molar teeth. With the premaxilla it forms the lower border of the nostril, meeting the septomaxilla. Its upper border articulates with the lacrimal, which completely separates it from the nasal.

In nearly all the specimens of *Tropidostoma microtremata* there are seen some molar teeth or tooth-sockets. In young specimens, which are about half the adult size, there are four molars, of which the first is the largest, and they decrease in size to the fourth. The four molars measure 10 mm. Only one specimen shows the crowns. These resemble closely the molars of *Pristerodon*, but those of *Tropidostoma* are rather stouter and the denticulation slightly coarser. In the 1st molar there are

probably seven denticulations, and in the 3rd, five. As *Tropidostoma* approaches the adult condition the molars seem to be gradually lost. Some specimens show only three, others but two or one, and in old age all trace of even the sockets disappears.

In those specimens which are regarded as males there is a pair of powerful tusks. In the supposed females, in place of the tusks are, as in "*Oudenodon*," caniniform processes. One specimen (R 871) is remarkable for having on the right side a well-developed tusk, and on the left side no trace whatever of a tusk. This specimen is probably the oldest animal of the series, and I regard it as a female which has developed a tusk on the one side.

The septomaxilla lies within the nostril forming its lower wall.

The lacrimal extends forwards between the nasal and the maxilla, and meets the septomaxilla.

The relationships of the bones of the top of the skull will best be understood from the diagram I have given. The greater part of the figure is drawn from specimen R 860, but the anterior and posterior portions are from two other specimens. Nearly every suture is confirmed by more than one specimen.

The most noteworthy features of the upper side of the skull are the presence of thickened bosses on the nasals, and the development of the postorbitals and parietals into a pair of lateral crests with a deep groove between them.

The palate has already been figured by Lydekker; but as I think he is in error in a number of points, and as the whole structure of the anterior palatal region is exceedingly well shown in specimen R 860, I think it worthy of being figured again. The great size of the palatal portion of the premaxilla is seen and the relations of the palatine, transpalatine, and pterygoid bones to each other. The prevomer has its lower border developed as a pair of plates. In this *Tropidostoma* differs from *Dicynodon*, and agrees with *Endothiodon* and *Emydorhynchus*.

The occiput has been figured and described by Seeley.